ASSOCIATION OF RENAL SONOGRAPHIC FINDINGS WITH PROGRESSION OF STEROID-RESISTANT NEPHROTIC SYNDROME IN CHILDREN

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BACKGROUND and OBJECTIVE

Steroid-resistant nephrotic syndrome (SRNS) in children is at high risk of progression to chronic renal failure (CRF). Judgments about irreversible renal disease are frequently based on the sonographic appearance of the kidneys. However, the data on the association between renal sonographic findings and clinical outcome of childhood SRNS are limited. Furthermore, the sensitivity and specificity of sonographic findings in identifying early stages of progression of SRNS in children have never been determined.

The aim of the study was to identify of the value of renal sonographic parameters as predictors of progression of SRNS to CRF in children.

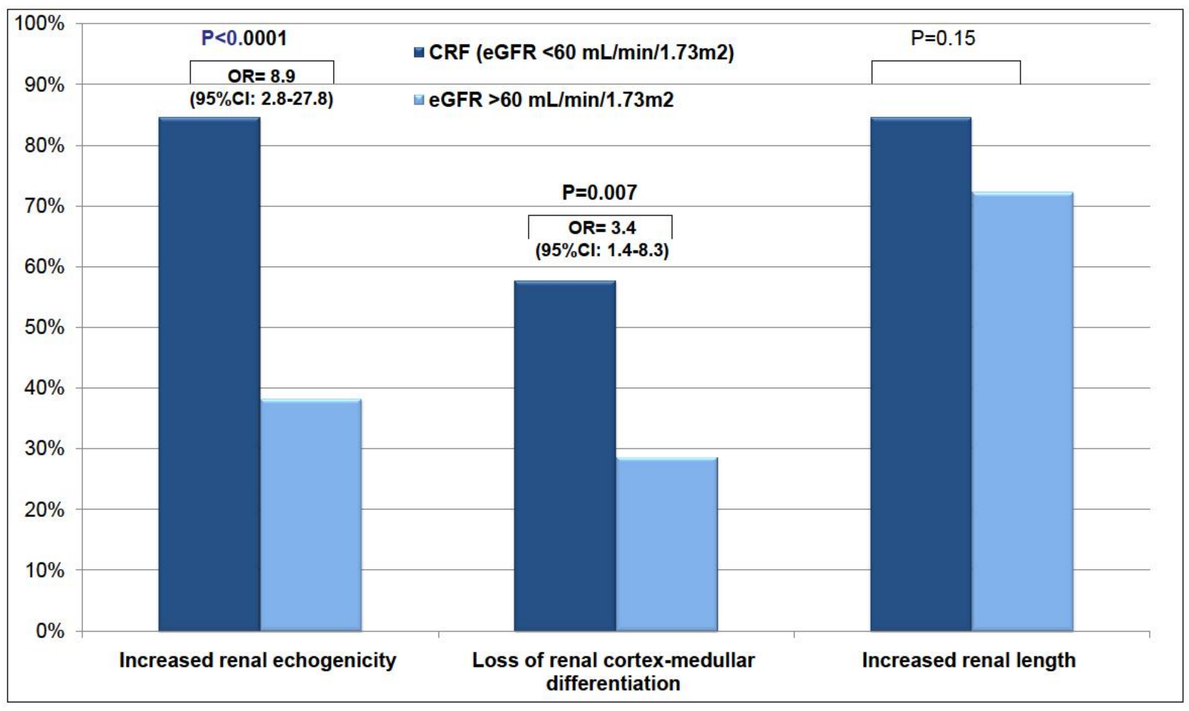
PATIENTS and METHODS

We conducted a retrospective single-center study of 120 children (52M/68F) with idiopathic SRNS. The median age at onset of disease was 9.5 (5.3; 13.0) years. Renal biopsy revealed: FSGS in 44.2%, mesangial proliferative GN in 23.3%, MPGN in 15.8%, minimal change disease in 11.7%, membranous nephropathy in 5% patients. Children were underwent renal sonography at the 6-8 weeks of initial steroid treatment. The duration of follow-up was 30.0 (18.0; 48.0) months.

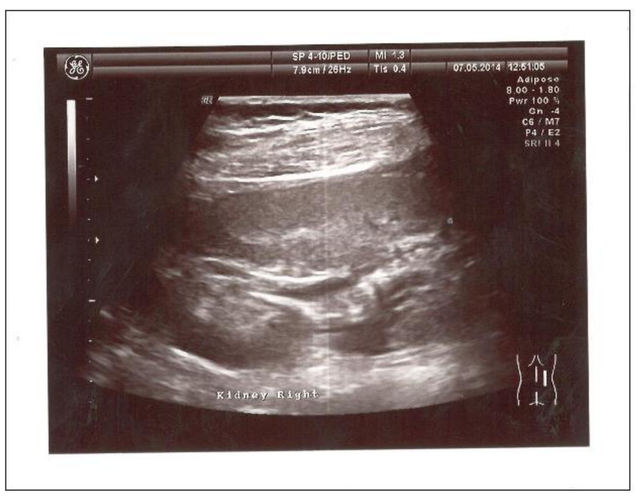
Patients were classified into 2 groups according to their eGFR at last follow-up: 1) progressed (eGFR<60 ml/min/1.73m^2) (n=26);
2) non-progressed (eGFR>60 ml/min/1.73m^2) (n=94).

RESULTS

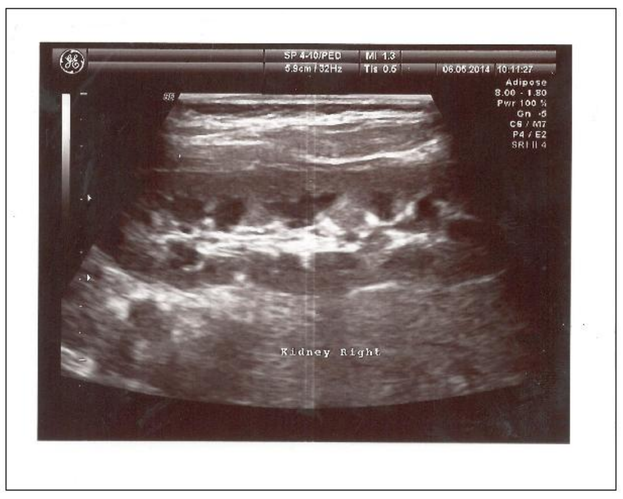
Frequency of renal sonographic abnormalities in SRNS children



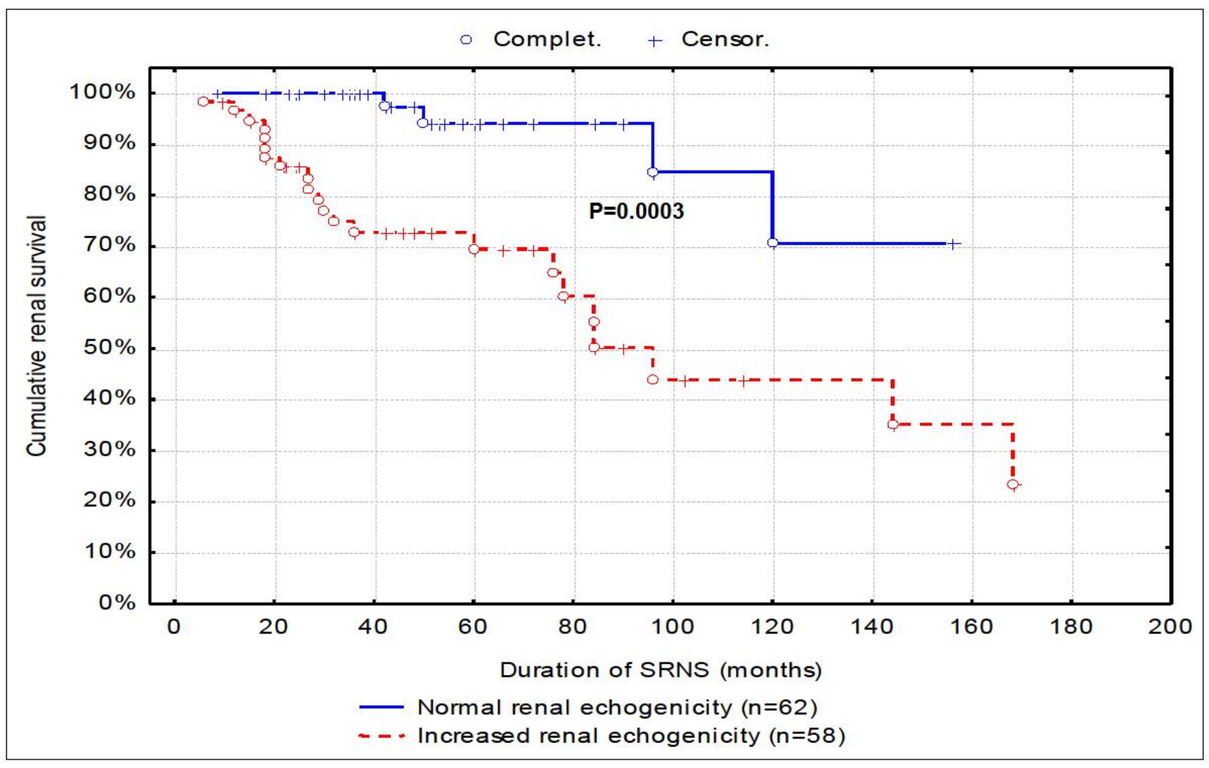
Increased renal echogenicity and loss of cortex-medullar differentiation in children with SRNS



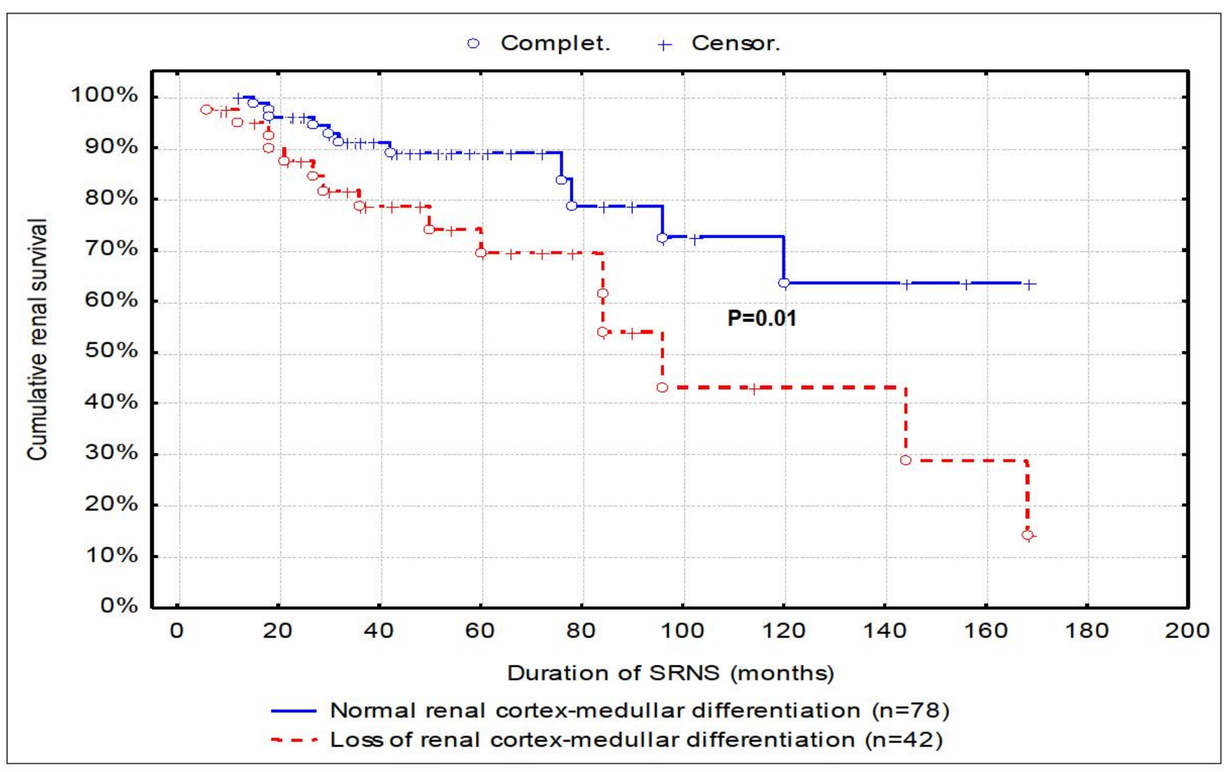
Normal renal echogenicity and cortex-medullar differentiation in children with SRNS



Cumulative renal survival subject to renal echogenicity in children with SRNS



Cumulative renal survival subject to renal cortex-medullar differentiation in children with SRNS



The frequency of increased renal echogenicity and loss of cortex-medullar differentiation were significantly higher in children with progression of SRNS to CRF in comparison with non-progressed patients: 84.6% vs. 38.3% (p<0.0001); OR=8.9 (95%CI: 2.8 - 27.8) and 57.7% vs. 28.7% (p=0.007); OR=3.4 (95%CI: 1.4 - 8.3), respectively. There were no significant differences in frequency of increased renal length between two groups of patients: 84.6% vs. 72.3% (p=0.15). 10-years renal survival was significantly less in patients with increased renal echogenicity and loss of cortex-medullar differentiation compared with children having normal sonographic parameters: 43.2% vs. 82.4%, (p=0.0003) and 42.1% vs. 71.8% (p=0.01), respectively. Univariate Cox regression model confirmed that increased renal echogenicity (p=0.001); HR=5.8 (95%CI: 2.0 - 16.8) and loss of differentiation between renal cortex and medullar (p=0.019); HR=2.6 (95%CI: 1.2 - 5.6) were significant predictors of adverse outcome of SRNS. Finding of increased renal echogenicity and loss of cortex-medullar differentiation in children with SRNS can predict progression to CRF with sensitivity 37% and 35.7%, specificity 93.6% and 85.9%, respectively.

CONCLUSION

Our results indicate that increased renal cortical echogenicity and loss of cortex-medullar differentiation revealed after initial steroid treatment in children with idiopathic steroid-resistant nephrotic syndrome associated with progression to chronic renal failure.

Conflict of interest: None.

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